

# LIGHTING

FOR THE

# HOSPITAL OF TODAY



# HOLOPHANE





## Importance of scientifically controlled lighting

Lighting can be good, bad or indifferent. Good lighting increases the ease and speed of seeing and favors safe aseptic operation, which is so essential in hospitals, from the surgery to the laundry.

Good lighting is also economical lighting, but to be eco-

nomical it must be controlled and not allowed to dissipate wastefully. The prism is to the light ray what the wire is to the electric current: it brings this beneficent force under economical control—it puts the light where and *in the manner* needed.

## Holophane prismatic control systems

The most exact means known to science for the control of light is the glass prism. With it two scientific principals are made use of—either separately or in combination. These are the principals of *reflection* and *refraction*.

In total *reflection* the light ray enters the prism and leaves it in a direction directly opposite to that in which it entered. The effect is the same as that produced with a mirror, but unlike silvered, enamelled, or polished surfaces, the glass prism is subject to no deterioration that cannot be quickly remedied by the application of soap and water.

In *refraction* the direction the light beam takes when it leaves the prism is governed by both the angle at which it enters the prism and by the angle of the faces of the prism itself.

Application of the physical laws governing the relationship of light rays and prisms, allows prediction of the effect of a given design to be made with mathematical precision. Thus Holophane engineers are able to forecast the behavior of any lighting unit and give an exact description of its performance before it is even manufactured. Since prisms are of glass, calculations are not upset by deterioration.

## Holophane specifics contribute directly to the War

### *Engineered for maximum efficiency—minimum operating cost*

**LESS CRITICAL MATERIAL USED**—Holophane specifics made principally of prismatic glass (a non-critical material) with minimum use of metal—fewer fixtures, lower wattage—less wiring.

**LESS ELECTRICAL POWER USED**—Maximum effective utilization of light gives proper illumination for given job with less wattage—fewer fixtures are needed—total power load is less.

**PERMANENT REFLECTOR EFFICIENCY**—A chemically inert material, glass is not subject to deterioration—initial efficiency of Holophane specifics is restored completely by periodic cleaning.

**MINIMUM MAINTENANCE**—Holophane fixtures give easy accessibility for lamp replacement—are quickly, easily cleaned with soap and water—fewer fixtures needed, fewer to service.

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**IMPORTANT NOTICE**—A small percentage of these hospital units are subject to mechanical construction changes to meet wartime requirements in Canada. These modifications, revisions, or eliminations, will be made clear to interested enquirers promptly and in detail. *The important results in illumination are not affected.*

The Holophane Co., Ltd., 385 Yonge Street, Toronto, Canada



# H O L O P H A N E   L I G H T I N G

## for the H O S P I T A L of T O D A Y



Before war struck and crystallized a new trend in hospital design, the modern general hospital had become a highly specialized, expensive building. Costs per bed were running from \$6000 to \$8000 in congested urban areas.

Despite this high cost the lighting of many hospitals built before and since the last war left much to be desired. Lighting equipment was customarily the last thing purchased—often when the money was running out.

The hospital had also become an increasingly costly type of building to operate. Hospital operating expenses had

risen from \$2.11 per patient-day in 1922 to more than \$6.00 in 1938. However lighting costs were not part of this rise as, contrary to most costs, they have fallen steadily since 1922.

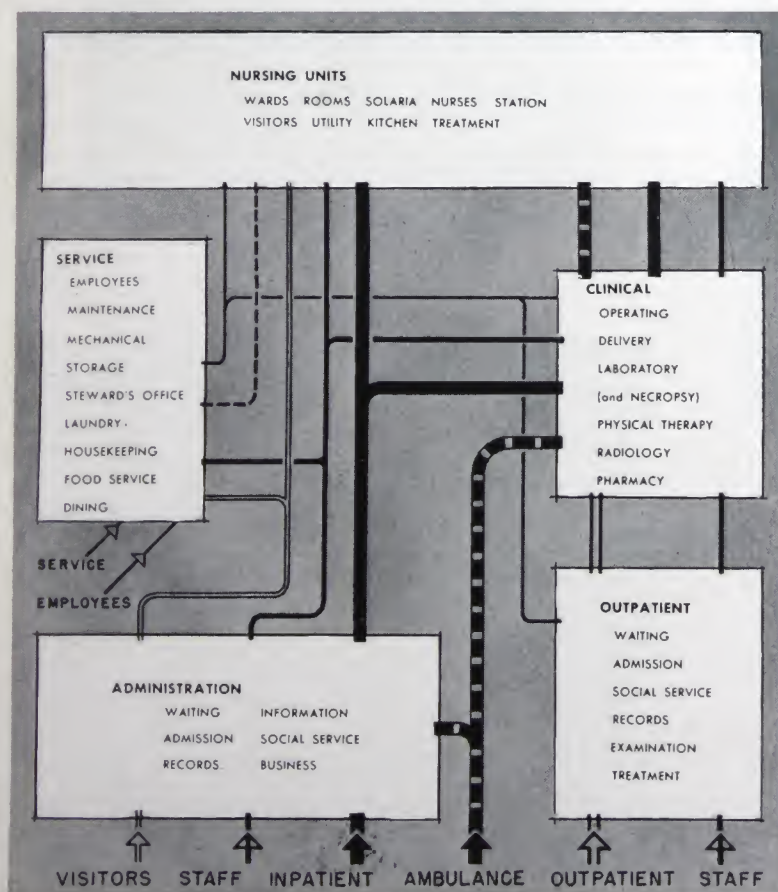
The present domination of the hospital building by the war, with its severe restrictions on critical materials and equipment, is accelerating the trend away from the expensive “huge, complicated metropolitan medical center,” and towards the small inexpensive hospital of 10 to 100 beds.

The large scale entry of the government into the small hospital field added to the natural advantages of the smaller unit can be expected to stimulate an increase in efficiency. Not a small part of this increase can come from a better and more careful use of light.

This booklet is offered as a guide towards this goal.

The principal areas of the typical small General Hospital are given below with their relative proportions:

	50 Beds	100 Beds
Clinical.....	19	to 17%
Administration.....	15	to 10%
Service .....	19	to 17%
Out Patient .....	0	to 6%
Nursing .....	47	to 50%





# LIGHTING for CLINICAL SERVICE AREAS

CLINICAL FACILITIES FOR THE AVERAGE 100 BED HOSPITAL MAY INCLUDE:

PRENATAL CLINIC

BABIES' CLINIC

EMERGENCY CLINIC

DENTAL CLINIC

SURGICAL SUITE

X-RAY SUITE

MATERNITY DEPARTMENT

PHARMACY

NECROPSY ROOM

PHYSICAL THERAPY DEPARTMENT

## PRE-NATAL CLINIC AND BABIES' CLINIC

Lighting requirements: Good local lighting for examination work (100-150 ft-c, see page 14)—plus comfortable general lighting of about 10 ft-c.

There are several satisfactory methods: The cheapest is to use a small floor spot, and "semi-indirect" or "indirect" units similar to the types shown below.

The most architectural method is to use lens units recessed flush into the ceiling. (See pages 10 and 11 for details of units.)

The most professional method is to use a medical examination unit as illustrated below *at right*. (See page 14 for unit details.)



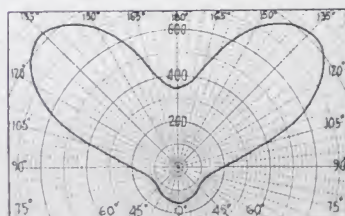
Filterlite  
Suspension Type



S-5640 for 300-500  
watt lamps



Filterlite  
Ceiling Type



Characteristic  
Filterlite  
Distribution



Recessed Holophane Controlens units in a room used  
for examination and minor work



Holophane Medical Examination unit No. S-5745 in use



## LIGHTING for CLINICAL SERVICE AREAS

### EMERGENCY CLINIC (For cuts, bruises, dislocations, etc.)

Lighting requirements: Same as for all surgery — edgeless spot of high intensity and good size, with comfortable general illumination throughout room. Spot illumination can be one-quarter of major surgery illumination (250-350 foot-candles), as work is mainly on the surface.

#### Lighting methods are:

1. A portable floor spot for the work and “semi-indirect” or “indirect” lights at the ceiling for room lighting. (See opposite page for units.)
2. A SPECIAL ARRANGEMENT OF LENS UNITS AT THE CEILING.

The cheapest is the Holophane No. 5 M.S.L. System exposed (see upper right picture). The most attractive method is the Holophane No. 5 M.S.L. System flush (see picture at right). Both systems are described on pages 5, 9, 10, and 11. Exact locations of units depend on room size and must be secured from our engineering department.



*Emergency Operating Room with Holophane No. 5 M.S.L. System Exposed*



*Emergency Operating Room with Holophane No. 5 M.S.L. System Flush*

### DENTAL CLINIC

Lighting requirements: Small spot at proper angle for entrance to mouth of 250 footcandles at mouth, or better, plus general lighting of 10 footcandles or better.

There are two methods in use:

1. A movable spot attached to chair, to wall bracket, to floor stand or suspended from ceiling, plus separate “semi-indirect” or “indirect” ceiling units.

2. FIXED CEILING SPOTS. The advantages of the latter are:

The Dentist is always sure of enough light without sharp shadows regardless of where or how he may be standing; he does not have to handle or adjust the lighting equipment; the uncomfortable radiation of heat from a nearby spot is avoided; and sufficient light is thrown around the room without the use of additional equipment.

This system is illustrated to the right and complete data regarding it is given on pages 11 and 17.



*Illustration showing Holophane Triple Spot Dental System used exposed on the ceiling*



# LIGHTING for CLINICAL SERVICE AREAS (Surgeries)

## COST

Surgery, which has developed amazingly in recent years, and now comprises a large part of the daily work in the average general hospital, has also become one of the most costly hospital activities. Good surgical facilities are so essential that hospitals uniformly maintain standards on the surgery floor at the highest possible level despite the cost, but hospital managements want to keep the cost as low as possible. With this thought in mind it is instructive to compare some of the items that make up the cost of an operation and so the figures for a hospital having an average of 220 patients and annual total operating expense of \$768,800 are given below:

Instruments—Repairs and Replacements.....	\$0.70
Other Equipment .....	0.25
Anesthetics .....	2.34
Drugs, Chemicals, Soap.....	0.74
Gauze, Cotton, Bandages.....	1.66
Rubber Goods .....	0.25
Sutures .....	1.15

The cost per operation, in this case, of a built-in Holophane surgery lighting system (No. 18 M.C.L.S.: including amortization on ten-year life, cleaning, lamp renewals, current cost, etc.) was 18 cents.

Light is one of the most essential factors in surgical work. Few would complain if it was one of the costlier items. People who have not checked the facts often believe it is. The above figures, showing that light is actually the cheapest item will come as a welcome surprise to many.

Before leaving this point for an explanation of the special visual and lighting requirements of surgical work two details are worth noting. First, that the most efficient, scientific, modern surgical lighting costs less per operation today than lighting by oil lamps did fifty years ago; second, that the spread in cost *per operation* between the poorest and the best modern surgical lighting equipment is approximately 8 cents.

**MAJOR OPERATIONS** usually involve deep penetration of the body. The edges of the incision, no matter how far retracted, shadow the interior of the cavity. The surgeon's hands and instruments also block light, so that not more than one-quarter of the light that reaches the plane of the incision diffuses inside the wound.

This 25% of the light is further reduced by the high absorption of cut flesh (90%), so that the brightness of the cavity interior cannot usually be more than 1/40th of a white surface at the mouth of the cavity. *Therefore, forty times as much light as comes from the wound to the surgeon's eyes, must be sent to the wound!*

To decide *how much* light should be sent to the wound, we must first discover how much should come *from it*: i.e., how bright the interior of the wound ought to be.

Surgeons frequently operate near the limits of their knowledge and skill, of necessity—and always, in order to reduce

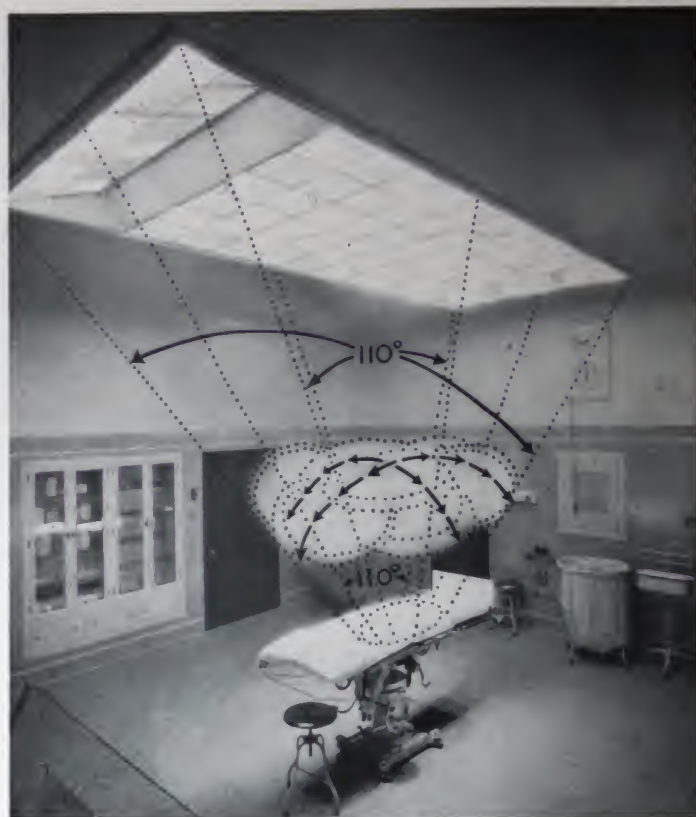


Diagram showing that the Holophane M.C.L.S. covers all the positions that can be occupied by an overhead, movable spot

the surgical shock, at the greatest possible speed. The more quickly and surely they can see, the less do they have to depend on their sense of touch. This increases their confidence, their speed and their safety factor, by reducing their tension with its quick fatigue build-up.

The wound interior may be dark enough to induce a high state of physical tautness and nervous tension in the surgeon—in other words—to create a hazard. There can be no questioning the desirability of making its brightness great enough to remove all hazard from this source.

Experiments on the speed with which people see show that it gains rapidly at first, with increasing light, and then levels off. Speed of vision begins levelling off at a brightness about equal to 25 footcandles on a white surface. This is borne out in practical experience by numerous checks of the output of piece workers, whose rate of work under artificial lighting reaches their habitual rate under daylight, and whose rate of errors under artificial lighting drops to their habitual daylight rate, at levels equal to about 25 footcandles on a white surface.

We are on safe ground therefore, when we decide that the interior brightness of the wound should be at least equal to 25 footcandles on a white surface. As this 25 footcandles can only be the residual effect of the illumination that must be poured on the wound in order to produce it, the original illumination must be 40 x 25, or 1000 footcandles—average minimum illumination on an area 15 inches in diameter. **Less than this is obviously not enough.**



## LIGHTING for CLINICAL SERVICE AREAS (Surgeries)



*Illustrating scientific illumination of an Operating Theatre, compared to the spot-lighting technique with its resulting dark "surround"*

**THE SURGEON'S EYES** are influenced by his entire field of view. He sees a "field" at least  $180^\circ$  wide, and  $125^\circ$  up and down. The operation occupies only a small portion of this field—about 4%. The light and the impressions from the other 96% of the surgeon's field of view outside his area of deep attention, have a most important influence on the clearness with which he sees the interior of the wound, and on the speed with which he forms his visual judgments. If little light comes from this large, outer part of the field of view, *as is the case when a spot is used to light the wound only*, the surgeon's keenness of vision is reduced, whether he realizes it or not; his speed is slowed; and he is further delayed by the time required for retinal adaptation whenever he looks up from his work.

**ILLUMINATION** of the entire operating room is, therefore, necessary; but *too much* is as bad as too little. Just enough is required—that is, the whole room should be so decorated and lighted that its brightness is *just a little less than the wound interior*, so there will be no unfavorable change in retinal adaptation when the surgeon looks up into the "surround." This other illumination is also necessary to the most efficient functioning of the rest of the surgery staff. This means a *peak of light at the operation, gradually subsiding all over the room, until it has dropped to about 25 foot-candles at the walls* (see illumination curve on page 6). This also means that the lighting system for each operating room must be individually and separately designed.

**BEFORE SUFFICIENT ARTIFICIAL LIGHT** was easy to get the light that could be procured was naturally confined to the operating area. This established a habit with the force of tradition, and many elaborate spot lights are now available that carry this no longer necessary poverty of light, to the "Nth" degree of efficiency. However, of the two methods of surgical lighting now in general use—local lighting by means of a movable spot and the fixed overhead, multiple lens system—the latter is the only one that can meet the fundamental requirements outlined in the preceding paragraphs; *and that is why it has been adopted by the Holophane Company.*

**THE HOLOPHANE MULTIPLE-CONTROLENS SYSTEM (M.C.L.S.)**, by subtending an angle of  $110^\circ$  at the incision, blankets all the positions that the standard system of overhead spot can reach by movement (see diagram on page 4 at left).

As the M.C.L.S. is stationary it is not a septic hazard.

It requires no attention during an operation, nor any adjustment by the surgeon. It leaves him free to operate in whatever attitude is best, with undistracted, full concentration.

It provides the correct, scientific visual relationships throughout the entire operating room.

It is safe; being on the ceiling it is outside the zone of explosion hazard; also, being on the ceiling, there is no glass in the zone of mechanical hazard (a struggling patient cannot put a hand or foot through glass).

There are no mirrored surfaces to reflect the operation into the terrified eyes of a locally anaesthetized but conscious patient.

There are from 15 to 21 lamps in each system, so a lamp burnout, almost vital with a spot, does not interrupt the illumination.

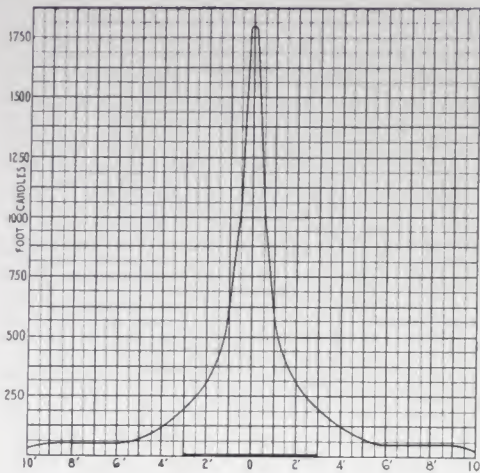
**SPECIALIZED OPERATING ROOMS** may require individual arrangements. Several are illustrated on pages 10 and 11.

These special arrangements are called *Multiple-Spot Lens Systems* (M.S.L.S.) and are designed to meet the same fundamental requirements previously discussed. They are installed either flush with the ceiling or exposed.

Their principal purpose is to fit special requirements, either as to type of operating room or type of building construction. They are widely used in surgeries devoted to ocular, oral or other head work; in surgeries having unusual ceiling heights, such as conventional amphitheatres; and in the general surgeries of hospitals in which existing beams, or other construction difficulties, prevent the use of the continuous (M.C.L.S.) system.



# LIGHTING for CLINICAL SERVICE AREAS (Surgeries)



Horizontal illumination curve under average installation conditions

## ILLUMINATION DATA

The illumination curve on the left (for an operating room 20 feet square). Shows that the average initial illumination figures will be:

15" dia. spot—1,300 ft-c  
entire table—700 ft-c  
entire room except table—50 ft-c.



Holophane No. 15 M.C.L.S. Exposed installation

Too much heat on the back of the surgeon's head and neck is annoying, and may be distressing. At the same time *some heat around the area of the incision is desirable*. Hot packs are sometimes resorted to in order to provide it. To meet these apparently conflicting requirements the Holophane major operating room lighting systems are specially wired. When the operating room nurse looks at the list to prepare

## HEAT

for the next operation she knows which of the four principal positions the surgeon will take, and she throws the switch marked *for that operating position*. The lights that would be blocked by the surgeon's body, and that warm his head and neck, *do not come on*. The remaining lights are designed to provide the full spot intensity, and they gently warm the area around the wound.



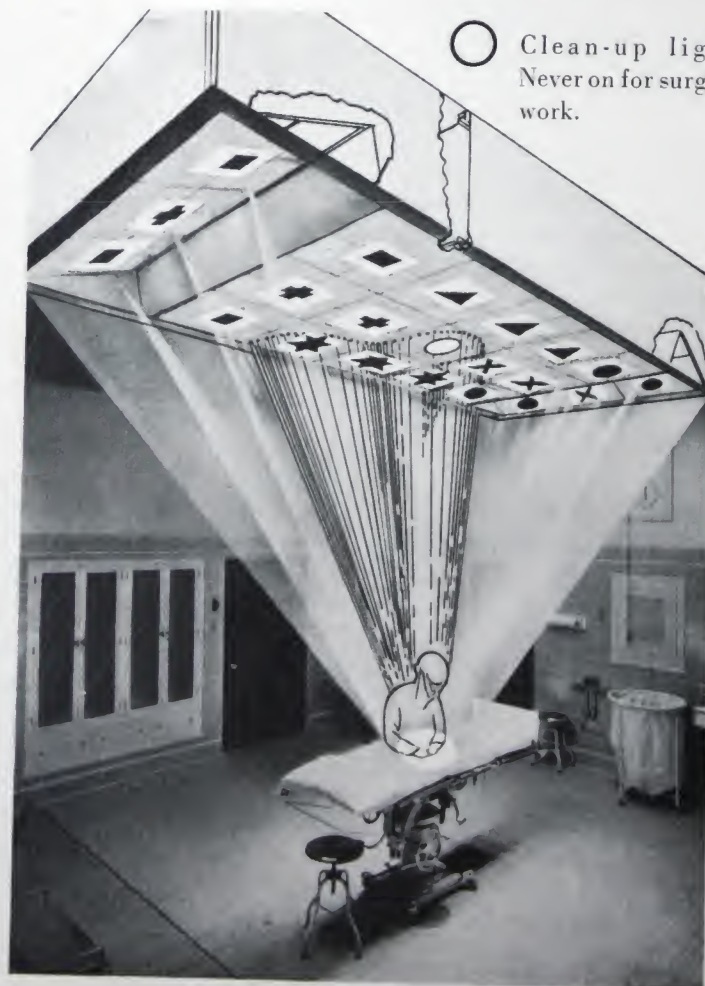
These lights are off with the surgeon in the position shown.



These lights are off when surgeon works at head of table.



These lights are always on during an operation.



○ Clean-up light.  
Never on for surgical work.



These lights are off when the surgeon works from the other side of the table to the position shown.



These lights are off when the surgeon works at the foot of table.



These lights are always on during an operation.



## LIGHTING for CLINICAL SERVICE AREAS (Surgeries)



*Holophane M.C.L.S. (flush)*

### HAZARDS

The greatest hazard lies in the illumination itself as it affects every operation. The most hazard-free method is a fixed lens system at the ceiling. It is the most accurate way of providing the proper visual relationships throughout the surgeon's entire field of view.

The surgeon can operate under less than excellent visual conditions, of course, but only at the expense of slower speed and more handling of tissues, and so greater SURGICAL SHOCK to the patient; and at the expense of greater tension on the part of the surgeon because he has to tighten his faculties to compensate for the imperfect illumination.

The second hazard is INFECTION. To the degree that post-operative infection is caused by air-borne organisms, fixed ceiling-level light sources, are safer than low hanging movable spots, as the latter may imperceptibly deposit contamination in a wound when moved or touched during an operation.

The third hazard is EXPLOSION. Explosions in operating rooms occur too often for complacency. Fortunately, this hazard is localized to the immediate neighborhood of the patient, and does not exist beyond 3 feet above the table as, at that distance, the diffusion and dilution of the gas has reached the point where it is no longer inflammatory or ignitable. The safety of spot-lights hanging in, or close to the explosion zone may be debatable; but there can be no question about the safety of a surgery lighting system installed at or in the ceiling.

Other hazards, minor and of less frequent occurrence, that are entirely avoided by use of the Holophane M.C.L., or M.S.L., Surgery lighting systems, include danger to the

patient or staff from something breaking or giving way as a result of its being moved during an operation; and distress or shock to conscious patients, operated on under a local anesthetic, who can follow operating procedure reflected in the mirrored surfaces of the lighting equipment.

The war has added the BOMB HAZARD. British experience shows that only a direct hit can affect ceiling lights. Concussion waves traveling from a hit in the neighborhood tend to damage vertical surfaces—windows and partitions. However, to eliminate possibility of flying glass splinters, the Controlenses in the Holophane surgery lights are made of our new "Hi-Stress" glass. They now require a stress about five times greater than before to cause fracture, and then they crumble harmlessly instead of splintering.

### ADJUSTABILITY

This means movement of the equipment to most people. Similar flexibility can be gained by movement of the *light*, without movement of the equipment, as in the Holophane system, in which a special switching arrangement enables the best lighting and comfort conditions for each operating position to be *pre-set* by the operating room nurse.

If the site of the operation should be unexpectedly extended there would be no need to move the table, under the Holophane system, as sufficient light is provided all over the table to permit satisfactory work. This unique feature also makes a separate light for the anaesthetist unnecessary.

### OBSOLESCENCE

Spotlights become rapidly obsolete. One authority gives them a life of two years. There are Holophane surgery lighting systems that have been in continuous use for seventeen years and are as good now as when installed. Devices that are only partial answers to a problem become obsolete as more complete answers are found. We believe that the Holophane surgery lights are fairly complete answers, and as far ahead as we can see they are not likely to become obsolete.

### VENTILATION

Air conditioning is becoming recognized as essential for the operating suite, and where it is used, the increase in base room temperature, caused by the surgery lighting, is easily taken care of.

Where air conditioning is not used the thermal characteristics of some operating rooms might in the *absence of normal ventilation*, permit an uncomfortable build-up of heat generated by the light. (Tests in *un-ventilated* rooms show rises in base temperature of 1½ to 13 degrees F. varying with room and location characteristics.)



# LIGHTING for CLINICAL SERVICE AREAS (Surgeries)

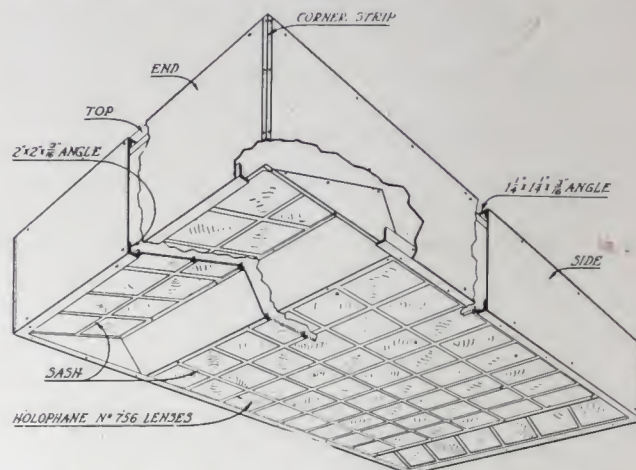
## VENTILATION (Cont.)

Any addition to the normal atmospheric temperature may be uncomfortable in the tropics and so where the Holophane M.C.L. System has been recently installed in Army Hospitals in the tropics the practice has been adopted of running a small duct from a filter register in an outside wall to one end of the light housing, and another duct from the other end of the housing to another outside wall, ending in an 8-inch exhaust fan. The fan is connected to the light switches so that when the latter is turned on the fan will continually draw a column of moving air through the light housing, thus reducing the amount of heat radiated into the operating room.

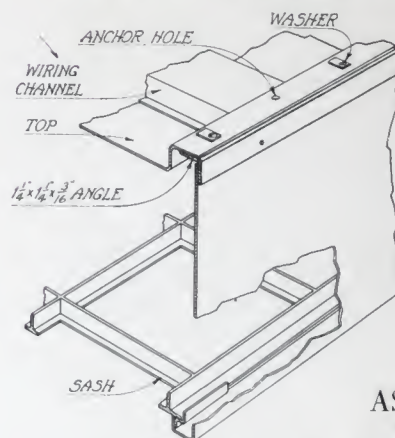
On the other hand no such provision is made for a similar installation in Greenland. There the additional heat from the light will be welcome.

**SPECIFICATION**—The major operating room lighting system shall be a self-contained unit ..... long (see tabulation below) 6'-5 $\frac{5}{8}$ " wide and 2' deep, consisting of an all metal housing of sheet steel bolted to structural steel angles. Sides shall be 16 gauge. Top shall be 20 gauge and shall contain adequate wiring channels.

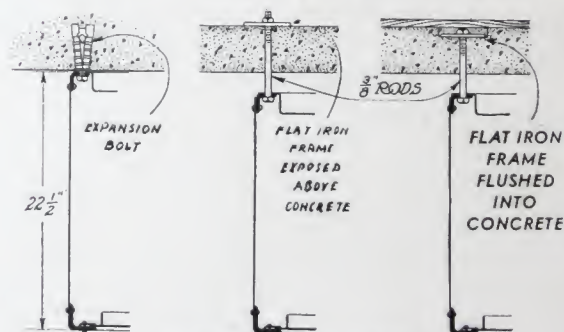
Bottom of housing shall be closed by structural steel sash carrying ..... specially treated heat and shock resisting prismatic lenses. The lenses shall be of the sectored plano-convex type, regressed to a flat plane, the segments being distributed in concentric form and extending completely into the corners of the lenses. The lenses shall be in quadrants, 12" square, four quadrants forming one complete lens. There shall be an orienting device at the center of each lens, on the sash, to ensure correct placement of each quadrant. The whole shall be complete with porcelain sockets, special brass reflector holders, prismatic reflectors designed to cooperate with the lenses and internal wiring. The wiring shall be in 7 separate circuits in wiring channels on top member and run to an internal junction box ready for connection to power supply and switching provided by others. Each socket shall be adjustable and located properly in its respective optical train and the whole equipment so designed, constructed, assembled and coordinated as to produce the illumination results shown on the curve which is a part of this specification, when properly lamped. Finish: all metal parts shall be given two coats of prime finish.



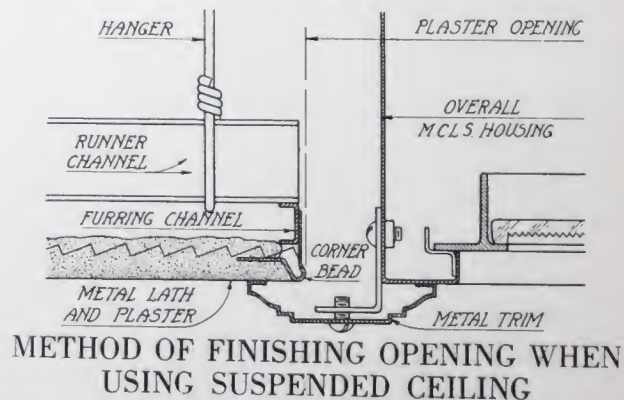
DIAGRAMATIC SKETCH OF M.C.L.S. SHOWING CONSTRUCTION DETAIL



ASSEMBLY DETAIL THROUGH SIDE



SOME SUGGESTED METHODS OF SUPPORT



METHOD OF FINISHING OPENING WHEN USING SUSPENDED CEILING

Catalog No.	For Mounting Heights	Shpg. Wt. Each	Dimensions, Inches		
			Length	Width	Depth
15-M.C.L.S.	8'6"- 9"	1475 lbs.	11'5 $\frac{1}{4}$ "	6'5 $\frac{5}{8}$ "	1'11 $\frac{3}{8}$ "
18-M.C.L.S.	9'6"-11"	1725 lbs.	13'6 $\frac{1}{2}$ "	6'5 $\frac{5}{8}$ "	1'11 $\frac{3}{8}$ "
21-M.C.L.S.	11'6"-12"	1975 lbs.	15'7"	6'5 $\frac{5}{8}$ "	1'11 $\frac{3}{8}$ "

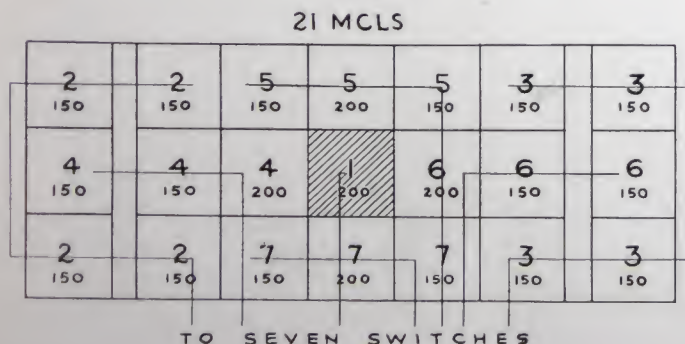
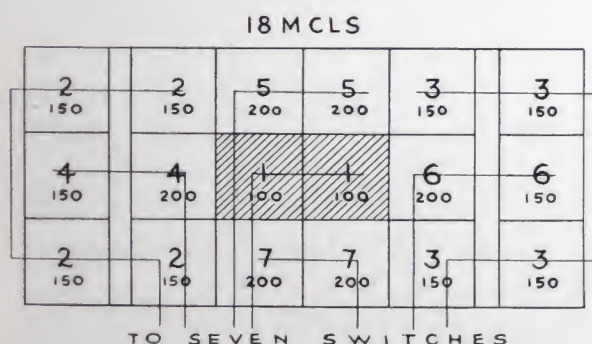
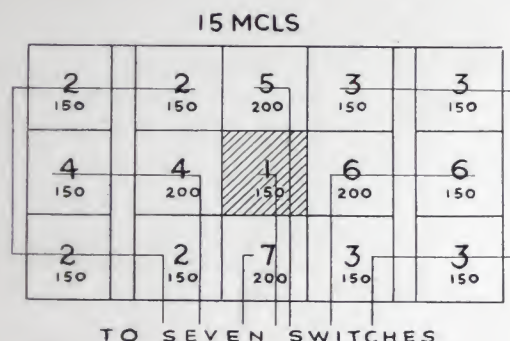


# LIGHTING for CLINICAL SERVICE AREAS (Surgeries)

**INSTALLATION AND ASSEMBLY INFORMATION**—The Holophane M.C.L.S. may be installed flush or exposed. If housing is installed (for flush job) during lathing, plaster may be run to it. If installed after ceiling is finished, plaster joint should be covered by separate trim (supplied only on special order). Top of housing is shipped in five sections, in crates. Sides and sash are shipped knocked down and crated. Small parts are packed separately in one box. Glass and holders are separately packed in cartons and barrels. All joining parts of the top, sides and sash are notch marked. Various installation methods may be successfully used but blueprints and instruction sheets are included with each unit.

## CIRCUIT AND LAMPING DATA

The correct lamp wattage is marked on each square of the diagrams below. Standard 100, 150, and 200 Watt incandescent lamps, available universally, are used.



## INFORMATION NEEDED FOR ENGINEERING LAYOUT

When mailing in a request for a layout be sure the following data is included:

1. Ceiling height from floor to finished ceiling.
2. When the light is to be recessed partly, or fully, the amount of clear space depth, width and length, inside the ceiling should be given.
3. State if the ceiling beams can be arranged to frame the opening for the M.C.L.S.; or if the M.C.L.S. must go under beams (sometimes a beam layout is needed).
4. Exact beam dimensions and locations are needed if the M.C.L.S. must be fitted around the beams.
5. The position of the operating table, in plan should be given, and a statement of how much it can be moved, in case a beam condition of the ceiling, or some other reason, should force us to shift the center of the light.
6. Tell us if we can turn the operating table at right angles if we found that position best.

**ACCESSORY SPOTS**—Kidney, rectal and obstetrical work require auxiliary spots, *irrespective of what overhead light is used*. The spots are not needed to provide sufficient illumination, but to reinforce it at the most effective angle; which, for such work, is an angle that cannot be reached from overhead sources, because they *are* overhead.

**COVER CLOTH**—A white cover cloth, under an illumination of 1000 footcandles, will have a brightness about 25 times that of the wound interior. This makes too great a reversed contrast. (Notice high brightness of white cover cloth in spotlighted action on page 5.) Neutral gray cloths are better. They absorb the overflow light in the neighborhood of the wound and improve visibility inside the cavity.

## THE HOLOPHANE MULTIPLE SPOT LENS SYSTEM

Holophane (M.S.L.S.), permits exactly "tailored" individual arrangements for specialized operating rooms. It can be fitted to unusual ceiling heights (7'0" to 35'0"). It can meet all sorts of structural difficulties and job conditions. It also meets the need in temporary structures where a high first cost cannot be justified, but where the rigid standards of surgical work must be maintained.



# LIGHTING for CLINICAL SERVICE AREAS

THE HOLOPHANE M.S.L.S. consists of 5 to 35 separate elements arranged in a scientifically determined pattern. Each unit is complete in itself, consisting of housing, lens frame, socket, reflector and lens. Plaster rings are not standard, nor necessary usually. Flush units have hinged lens frame.



Photo and Line Sketch No. H-755-FL

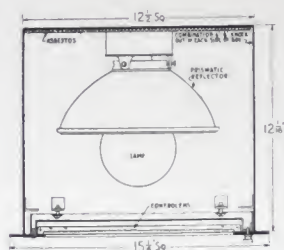
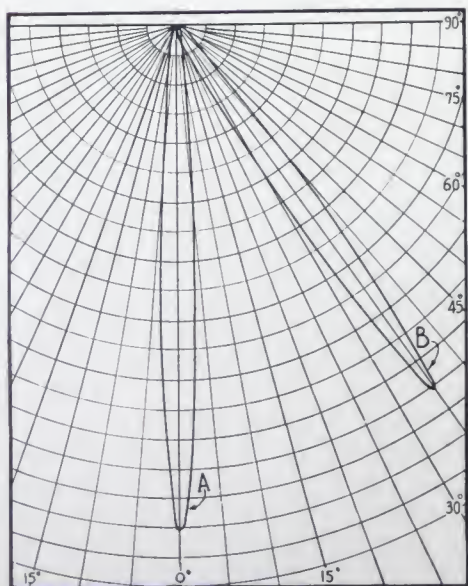
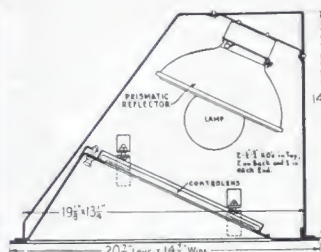


Photo and Line Sketch No. H-755-TF



Curve showing concentration and beam throw—"A" for single level element, "B" for single tilted element



A special  
Holophane No. 16 M.S.L.S. installation, for eye work,  
with observatory above

**SPECIFICATION**—The . . . \* flush lighting system shall be composed of . . . \*\* units, each consisting of 16 gauge steel housing, to which is attached by four concealed screws a 12 gauge steel face plate, having fastened to it by two hinges and one thumb screw latch, either horizontally or at an angle of 25° (depending upon location of unit in system) a 12 gauge steel frame, which contains a 12" square specially treated heat and shock resisting prismatic glass lens having equally spaced concentric refracting elements, extending to the corners of the lens. The housing shall contain a prismatic glass reflector designed to optically complement the lens, a cast metal reflector holder and medium base socket, all parts being arranged to form an optical train that will deliver at least 5500 candlepower, perpendicular to lens and 4700 candlepower at an angle of 35° from the vertical in the case of the sloping lens, when using 150 watt clear lamp at rated voltage. Further, the performance and arrangement of the separate units shall be such that when used in combination all light beams will merge on the same area of the operating table; no direct light from the units at angles of 60° or greater from the vertical shall exceed 100 candlepower and sufficient light shall be distributed around the entire room so that the average horizontal footcandles, measured outside the operating area, shall be at least 5% of the latter. Finish: all exposed metal parts and outside of housing shall be grey baked enamel. Inside housing shall be white polymerin lacquer.

**NOTE:** Specification for exposed system is similar to above except that descriptions of units used should be taken from page 11.

\*Insert "Delivery Room", "Emergency Operating Room", "Minor Surgery" or whatever applies.

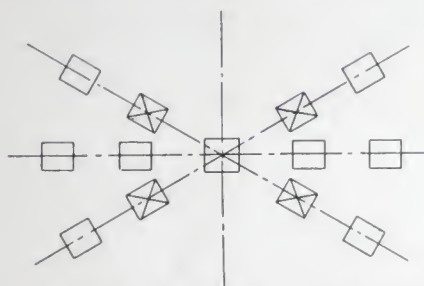
\*\*Insert number of units.



# LIGHTING for CLINICAL SERVICE AREAS



No. 7—M.S.L.S. Flush in Minor Surgery



Plan view of typical No. 13 M.S.L.S. shown. No. 5 M.S.L.S. also indicated composed of center unit and 4 units with diagonals drawn



A special Holophane No. 20 M.S.L.S. Flush installation

**INSTALLATION INFORMATION**—Units are available for both flush and exposed use. Plaster frames for flush installation can be supplied additional when desired. Units are shipped complete minus glass, which is packed separately for assembly in units after installation. The locations of the units are usually laid out on the floor, then plumbed to the ceiling. Holophane Engineering Department blueprint layouts are essential.

Catalog No.	Hanging Weight*	Lamp Size	Dimensions
H-755-FL	25	150 or 200	We will provide blueprint layouts upon receipt of room dimensions and information on job conditions.
H-755-TF	32	150 or 200	
D-729-L	11 1/2	150	
D-729-T	9 1/2	150	

\*To find the total installation weight of an M.S.L. System, multiply the number of level and tilted units comprising the system by the above weights. Shipping weights are given in the Holophane Datalog.



Photo and Line Sketch No. D-729-L

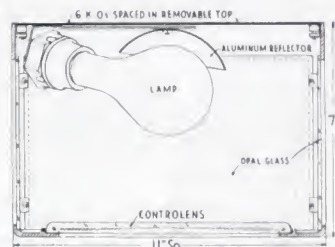
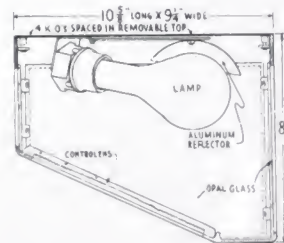


Photo and Line Sketch No. D-729-T



## SPECIFICATION OF EXPOSED TYPE UNITS

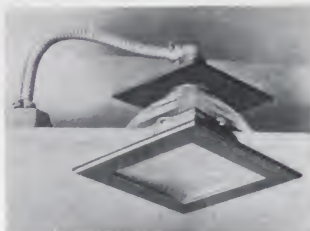
Each unit shall consist of a cast metal frame containing opal glass panels in the four sides, 8 1/2" square specially treated heat and shock resisting prismatic glass lens having equally spaced concentric prisms extending to the corners of the lens, horizontally held in one unit, and held at an angle of 25 degrees from the horizontal in the other two units; polished metal reflector and porcelain medium base shell socket; all parts being arranged to form an optical train that will deliver at least 8500 candlepower perpendicular to the lens and 7500 candlepower at an angle of 35 degrees from the horizontal in the case of the sloping lenses, when using 150 watt clear lamp at rated voltage; no direct light from the units at angles of 60 degrees or greater from the vertical shall exceed 100 candlepower. Finish: all exposed metal parts shall be polished steel.

**IMPORTANT NOTICE**—A small percentage of these hospital units are subject to mechanical construction changes to meet wartime requirements in Canada. These modifications, revisions, or eliminations, will be made clear to interested enquirers promptly and in detail. *The important results in illumination are not affected.*

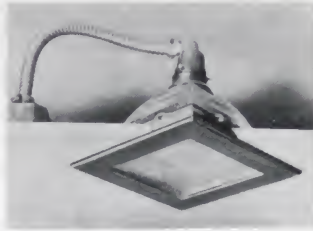


# LIGHTING for CLINICAL SERVICE AREAS

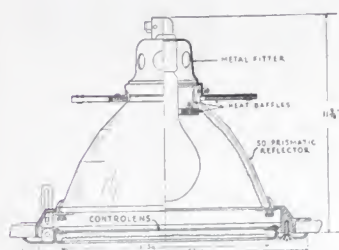
**SCRUB-UP AND STERILIZING ROOMS** are usually lighted by a standard commercial unit, although the rigid need for asepsis would indicate the desirability of a flush ceiling unit. The illumination of these rooms is obviously governed by the general level in the operating rooms—it should be at least half. This usually means 20 to 25 ft-c.



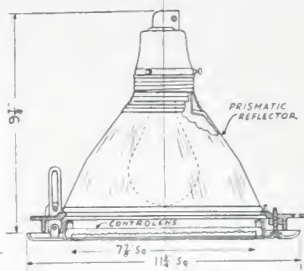
*Holophane No. R-1774  
150-200 watts*



*Holophane No. R-1748  
100-150 watts*



*Sectional view—No. R-1774*



*Sectional view—No. R-1748*

**THE ANAESTHETIZING ROOM** may be lighted in the same manner, unless the local inspector rules otherwise. In some cases "explosion-proof" equipment is required. In others vapor-proof equipment may be acceptable. In the latter case a satisfactory unit is shown below. 10 ft-c. is sufficient light.

*Holophane No. 02470 Vapor  
tight unit for use with 100-  
150 watt lamps  
Dia. 9 $\frac{7}{8}$ "—Depth 10 $\frac{1}{2}$ "*



**NURSES' WORK ROOM, INSTRUMENT ROOM and UTILITY ROOM** are most economically lighted by enclosed direct lighting units. Suitable types are:



*Ceiling Type  
Correctalite C-5540  
Dia. 15 $\frac{3}{8}$ "—Depth 13"*



*Ceiling Type  
Reflector-Refractor  
Dia. 12"—Depth 12 $\frac{3}{4}$ "*

**X-RAY SUITE**—The size of this department varies considerably and is tending to increase as the radiographic sciences are constantly expanding in use and importance.

Complete light-proofing is needed in dark rooms and treatment rooms. The dark room is usually entered through a double vestibule called a light trap.

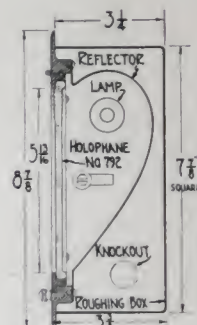
Special lighting requirements should be worked out in consultation between the roentgenologist and other consultants.

The general lighting can be by means of semi-indirect or indirect units as described on Page 2.

**MATERNITY DEPARTMENT and DELIVERY SUITE —LABOR ROOMS** should be lighted similarly to sick rooms (see pages 18 and 19). More use of the night light is to be expected so that a separate night light, preferable located in the wall under the head of the bed is more necessary.



*No. W-792*



*Section through unit*

## HOLOPHANE NIGHT LIGHT

**DELIVERY ROOMS** require special lighting. Adequate illumination of the process of birth is conceivably the most important matter in the whole field of illumination. A special arrangement of ceiling spots is desirable.

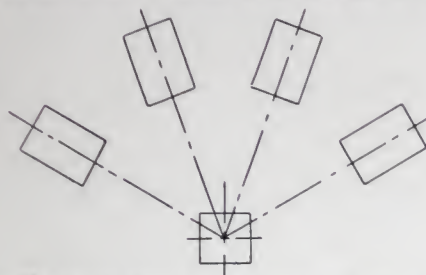


*No. 5 M.S.L.S. Flush in Delivery Room*



## LIGHTING for CLINICAL SERVICE AREAS

The least expensive method is to install exposed equipment on the ceiling. The most architecturally satisfactory method is to install flush units. 250-350 ft.-c. illumination is required. Details of individual units are given on pages 10 and 11.



Plan showing typical arrangement of Lens Units for Delivery Room



No. 5 M.S.L.S. Exposed in Delivery Room

**NURSERIES** should be lighted so that there is ample illumination over the tables but no direct light on the bassinets. The common practise of using commercial diffusing units on the ceiling is undesirable. Two better ways are an opaque wall bracket over the table lighting downwards, or a flush lens unit in the ceiling over each table.

Where cubicles are used it is a mistake to put the wall bracket, or ceiling lens unit over the cubicle. The light source should be over the basin, with the distribution controlled so that little goes directly to the bassinet.



Holophane No. F-796

Dimensions:

Face Plate—9 $\frac{5}{8}$ " sq.  
Roughing Box—6" deep

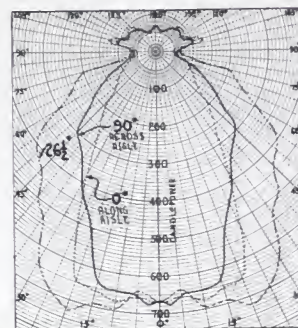
**THE BABIES' FORMULA ROOM** may be lighted with standard direct, semi-direct, or indirect units. The first is most economical, the last most comfortable. See pages 2 and 12 for descriptions of the units.

**PHARMACY**—Operations carried on include storing of all supplies (divided into active and reserve storage, and special storage for drugs and poisons), and compounding or manufacturing and dispensing of solutions and prescriptions. The pharmacy sometimes also serves as a central supply service, for distributing surgical and other hospital supplies.

If the hospital includes an out-patient department, a dispensing room and waiting room will be added to the Pharmacy.

Special lights that will illuminate the stock shelves uniformly from top to bottom and the shelf space between lights, are desirable in the storage areas. Ordinary lights put only 1/50th as much light on the bottom shelf as they put on the top shelf.

### STOCK SHELF UNITS 50-60 WATT LAMPS



Characteristic Curves

Above at left: No. 02176  
Dia. 9 $\frac{7}{8}$ "—Depth 7"



At right: No. 02076  
Dia. 8 $\frac{3}{4}$ "—Depth 7"

The prescription department should have indirect illumination (see page 2 for recommended equipment) 20 ft.-c. needed. The waiting room may have 10 ft.-c. of either direct or semi-indirect lighting (pages 2 and 12).

**LABORATORY**—A single room is used in very small hospitals (50 beds or less). Beyond this, laboratory services may be expanded to include separate provisions for pathology, serology, bacteriology, chemistry, hematology, urinalysis, metabolism, etc.

Laboratories for general work, research pathology, night work and museum rooms may be lighted by either direct, or semi-indirect ceiling mounted equipment, spaced and lamped to deliver 20-25 ft.-c. Suitable equipment appears on Pages 2 and 12.

Where work tables run around walls and center of room is clear, the lights should be over the tables so that the workers will not have to sit with their backs to centrally located lights. The lighting of specialized laboratories should be worked out with a lighting consultant.



## LIGHTING for CLINICAL SERVICE AREAS

**MORGUE**—Usually located in the basement so that bodies may be taken out inconspicuously. Minimum equipment includes an autopsy table, clinic sink, work table with scales, instrument closet and instrument sterilizer, plus one or more refrigerated compartments for corpses (internally lighted).

As work on corpses is not performed against time as is the case with work on the living, less illumination may be used, satisfactory seeing resulting from working at a more leisurely gait.

A single medical examination and autopsy unit, of the type shown below, may be used for each autopsy table, or a fixed system of five ceiling spots (Page 3). The former is the least expensive particularly when two or more tables are used.

This unit provides a concentrated beam of intense light for critical work and examination plus a high level of general illumination. The beam is controllable by means of a pendant chain that opens and closes an iris shutter, which enables the user to secure any intensity on the examination area from ordinary room illumination up to the full power of the beam (5600 candlepower).

It provides light for the examination table, etc. without the *inconvenience* of employing accessory lighting equipment and also assures adequate general illumination at all times.

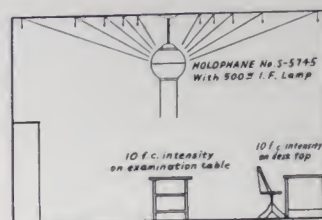


No. S-5745 using 500 watt standard, clear lamp  
Dia. 14"—Depth 36"

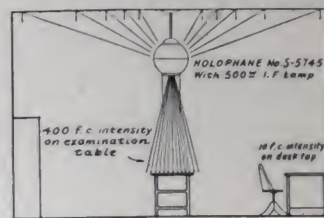
**THE HOLOPHANE MEDICAL EXAMINATION UNIT** is unique in containing within one dirt-resisting, smooth, crystal sphere, two distinct optical systems: one for general illumination at all times, and one for special illumination when and as desired. The iris shutter mechanism, which is entirely inside the unit, is the finest obtainable—quiet, smooth and moves at a touch. It stays put at any size of opening.

**14**

**IMPORTANT NOTICE**—A small percentage of these hospital units are subject to mechanical construction changes to meet wartime requirements in Canada. These modifications, revisions, or eliminations, will be made clear to interested enquirers promptly and in detail. *The important results in illumination are not affected.*



General Illumination  
Diaphragm Closed



Examination Use  
Diaphragm Open



No. S-5745 used in a doctor's office

### PHYSICAL THERAPY DEPARTMENT

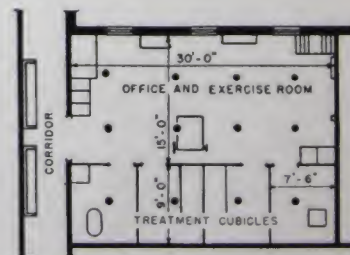
Means of treatment include heat, massage, electricity, exercise and hydrotherapy. Types of plans range from a single large room which includes all equipment, office space and treatment cubicles to a number of separate rooms for each therapeutic measure.

A flush system of ceiling lens units (see page 12) is ideal for the former case, the lights being so spaced that each cubicle has its own lighting unit, separately switched; the remaining units lighting the general area outside of the cubicles.

A more common but less desirable arrangement, is to have bracket lights in the cubicles, and direct, semi-indirect or indirect ceiling units for general lighting. 15 ft.-c. is sufficient.

In the case of a number of specialized rooms the lighting should be determined with the aid of a consultant.

Physical therapy room  
for a 50-bed hospital,  
developed by  
Dr. F. H. Krusen





## LIGHTING for ADMINISTRATION AREAS

**ADMINISTRATIVE AREAS** perform a double function. They provide for an efficient control of hospital plant and activities, and they serve as the hospitals introduction to the visitor or patient. The lighting of these areas should therefore satisfy both visual and appearance requirements.

The **PRIVATE OFFICES**, **GENERAL BUSINESS** and **CASHIER'S OFFICES** and **SECRETARIAL SPACES** may be satisfactorily lighted by direct (page 12), semi-indirect or indirect equipment (page 2). "Direct" will be most economical. "Indirect" will be acceptable in offices high enough, or small enough, to prevent the units being part of the working field of view. It is the most comfortable, but also the most expensive method to operate. "Semi-indirect" is a compromise between the other two. 15 ft.-c. should be provided.



*Typical secretarial space lighted by "Direct" type Holophane "Correctalites"*

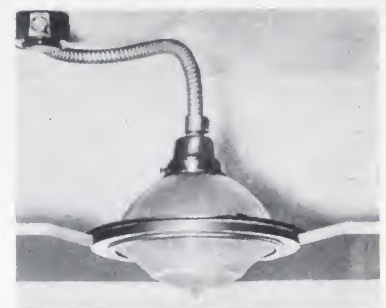
The **PUBLIC AREAS**, **LOBBIES**, **WAITING ROOMS** and similar spaces vary so much in arrangement and architectural treatment that general lighting recommendations are impractical. The best that can be said is that, where modern functional design is adopted, flush ceiling lens units will be most appropriate (see page 12), as well as being least costly to operate and easiest to maintain. 10 ft.-c. is sufficient, except over the information desk which may be lighted from flush lenses in the ceiling over head to give 20-25 ft.-c.

The special type of lighting recommended for the bin and shelf space in the pharmaceutical department is best for **LOCKER ROOMS** (see page 13).

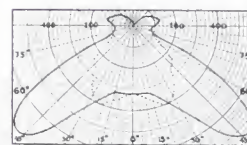


*Special Desk lighting from flush Lens units in ceiling in a Business Manager's Office*

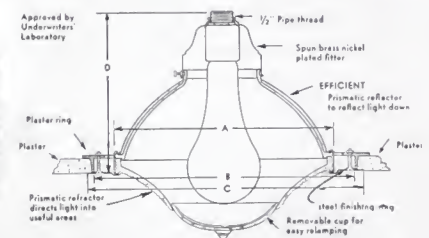
**CORRIDORS**—A special type of unit with a distribution of light to fit long and narrow spaces is available for the corridors. It permits the usual wide spacing between units.



*Corridor units—exposed type left—"In-bilt" type at right*

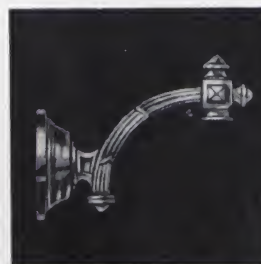


*Characteristic Curves  
Corridor unit*



*Dimensional Data of recessed  
Corridor unit No. R-2172*

**PARKING SPACE**—Provision for adequate parking space includes lighting. The most durable and effective equipment is the small enclosed refractor similar to the larger sizes used for street lighting. It may be installed in a harp fixture or on brackets, on poles spaced apart five times their height: or hung on messenger cables strung across from side poles.



*Bracket No. 0865*



*No. 830—No. 832*



## LIGHTING for SERVICE AREAS

There are several types of service spaces to be considered from a lighting standpoint.

The LAUNDRY, DISHWASHING, TRUCKWASHING, KITCHEN and RECEIVING areas should all have direct lighting. Steam and water vapor conditions in the laundry, dishwashing and truckwashing areas suggest a water-tight and corrosion-proof construction such as those illustrated below. 20 ft.-c. is desirable.



No. 12200-12201

Dia. 31 1/2" — Depth 12 1/2" (150W)



No. 16503

Dia. 20 1/2" — Depth 10 1/2"

The kitchen and receiving area can be well-served with the type of equipment illustrated at the bottom of page 12. 20 ft.-c. for the kitchen and 10 ft.-c. for receiving area.

WORKSHOPS (electricians', carpenters', plumbers' etc.) are industrial spaces and the best industrial practice should be followed. Open-bottom, direct lighting type, prismatic industrial reflectors are not only the most efficient, best appearing and most economical, but are also standard practice in industry. 20 ft.-c. is proper. (Typical units below.)



No. 554 — No. 5540 — No. 5541 For 200-500-200 watt lamps

STORAGE SPACES require more light than is usually allowed them. Drug storage is mentioned on page 13. General and kitchen storage may be lighted with the units shown immediately above. Meat storage may require a non-corrodible unit (see top of this column). 10 ft.-c. is necessary.

DINING ROOMS for nurses, help and the public are most economically lighted with the direct lighting shown on page 12. (10 ft.-c.)

The staff dining room may be lighted by an indirect unit as recommended for offices (see page 12).

CLASSROOMS AND LECTURE ROOMS are lighted in a variety of ways. Direct, semi-indirect, indirect and recessed-flush direct equipment all find favor.



Classroom with direct lighting using Holophane "Cornucopias" (See page 12)

Direct lighting equipment will as usual be the least expensive in the long run. Recessed-flush lens equipment will be the most satisfactory. Many types of flush Holophane Controlens units are available, both round and square, small and large to meet all possible needs and tastes. 25 ft.-c. is conservative practice.



Lecture room using flush Holophane Controlens units No. R-3394



Classroom with direct lighting using Holophane recessed flush Controlens units, No. R-3394



# LIGHTING for OUTPATIENT DEPARTMENT

When slides or films are to be shown, and notes taken, precautions are necessary to prevent direct light from the room units reaching the screen. Suspended or on-ceiling units will need a baffle against screen side. Recessed lens units will not need baffling if the row nearest the screen is set back sufficiently.

**BLACKBOARDS** need additional light. Commonest practise is to install special blackboard lights on or in the ceiling.



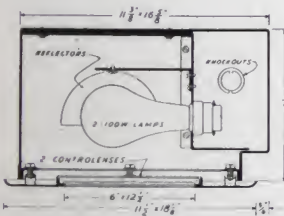
No. F-796-2



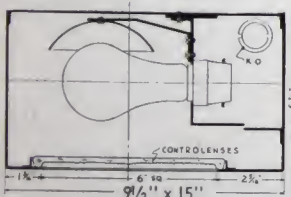
No. E-796-2



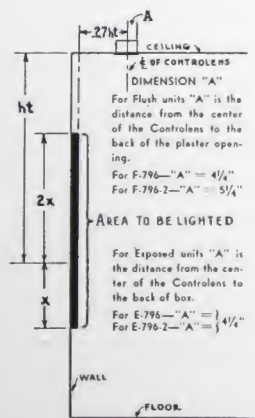
Blackboard lighted by equipment flush in the ceiling



Sectional View No. F-796-2



Sectional View No. E-796-2



These blackboard lights may be frequently used without the room lights. They should be spaced a minimum of 5 feet, center to center, and should be placed out from the wall 27/100ths of the distance from the ceiling to 2/3rds of the depth of the blackboard.

## OUT-PATIENT DEPARTMENT

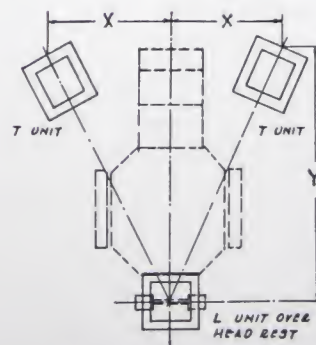
Out-patient requirements are subject to wide variations. Variables include, for example, whether state tuberculosis and venereal clinics are to be included, whether a psychiatric clinic is to be housed, whether a diagnostic and preventive health clinic are to be provided, whether the school clinic is to be taken care of in the out-patient department and the necessity for giving dental service.

The hours of operation may affect the lighting. Clinics open only in daylight hours may not require as careful lighting as night clinics.

In general the practice already indicated in this Booklet may be followed but the services of a qualified lighting consultant will be found helpful, with the exception of the lighting for dental service, which is specially illustrated below.



Photo of Dentist's Office using Exposed Dental Spot Lens System



Ceiling Height	Dimension "X"	Dimension "Y"
8'-0"	1'- 7"	2'- 9"
8'-6"	1'- 9 1/4"	3'- 1 3/4"
9'-0"	1'- 11 1/4"	3'- 4 1/4"
9'-6"	2'- 1 1/2"	3'- 7 1/2"
10'-0"	2'- 3 1/2"	3'- 11 3/4"
10'-6"	2'- 5 1/2"	4'- 3 1/4"
11'-0"	2'- 7 1/2"	4'- 7"
11'-6"	2'- 9 3/4"	4'- 10 3/4"
12'-0"	3"	5'- 2 1/4"

**IMPORTANT NOTICE**—A small percentage of these hospital units are subject to mechanical construction changes to meet wartime requirements in Canada. These modifications, revisions, or eliminations, will be made clear to interested enquirers promptly and in detail. *The important results in illumination are not affected.*



## LIGHTING for NURSING AREAS

Each floor, or portion of a floor devoted to the care of patients, is composed of easily definable units which are repeated as required. However, these "units" are lighted in almost as many different ways as there are hospitals, ranging from a simple bathroom type wall bracket to a combination of ceiling light, flush wall light, night light, bed light, table lamp and floor lamp.

The increasing use of portables in the nursing areas of hospitals may be a result of the trend towards a "homey" atmosphere. However, home lighting methods are the most expensive and inefficient in the entire field of illuminating engineering. Portable lamps and brackets (particularly the adjustable kind) are always needing attention. This is one place where the ever-mounting costs of some hospitals can be cut.

For example, distinction might be drawn between the degree of need for a "homey" atmosphere in a general hospital as compared to a tuberculosis hospital. In the average general hospital 70% of the bed patients are surgical and stay an average of only twelve days. A patient will stay for months, or even years, in a tuberculosis hospital. A domestic type of environment for the patient may be desirable in the latter case despite its high cost but, strange to say, few tuberculosis hospitals provide home-like environments while many general hospitals do.

General hospitals could properly take advantage of efficient, low-priced lighting methods for nursing areas.

The MINIMUM ESSENTIALS are enough light to permit reading and talking (10 ft.-c.), and to enable the nurse to perform her duties; plus a second low level of light (0.03 ft.-c.), sufficient to prevent stumbling around and disturbing the patient during necessary night inspections.

Some hospital consultants and others object to ceiling lights. They are used so predominantly because they are satisfactory even if not ideal, and represent the least expensive way to light the whole sick room with reasonable uniformity. Few, if any, patients complain about the ceiling lights in the average general hospitals. They are either too sick to notice them or are recovering and able to sit up and use the light. It should be remembered that ceiling lights are turned out when patients are resting, except on the brief occasions when the doctor calls or the nurse needs the light.

A totally enclosed, smooth outside semi-indirect unit is best, such as illustrated at right above:

Large WARDS are usually lighted by wall brackets over and behind each bed and ceiling lights along the corridor area down the center of the ward. Where provision is made for separate screening of each bed a bracket, of the types illustrated on page 19, does an excellent job.

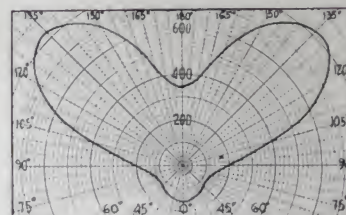
Where there is no screening, an opaque bracket light will be more comfortable for patients on the opposite side of the ward. As long as the war lasts such opaque brackets may be impossible to obtain in metal; instead an opaque plastic cover may be placed on a luminous bracket, such as the one shown on page 19.



*Filterlite  
Suspension Type*



*Filterlite  
Ceiling Type*



*Characteristic  
Filterlite  
Distribution*



*A three-bed, semi-private room, lighted by Holophane Filterlites*

**BED LIGHTS** attached to the bed are not practical. When the head of the bed is cranked upwards the light is hidden and useless. Flush wall lights behind the head of the bed have been successfully used from time to time (see illustration on page 19). Unfortunately, they are not particularly efficient, especially when louvred for the comfort of visitors, who must face them when talking to the patient. They are also expensive although their higher cost is to some degree offset by the reduced wiring cost involved in concentrating wiring for both bed and night light in the same wall.



## LIGHTING for NURSING AREAS



*Typical Bracket type  
open reflector shade*



*Typical small bracket  
type Reflector-Refractor*



*Private room showing wall light above bed and night light  
under bed*

**NIGHT LIGHTING** may be provided either from an auxiliary socket in the ceiling fixtures, equipped with a 5 watt lamp, or better from a fixture placed flush in the wall, near the floor and preferably under the head of the bed.

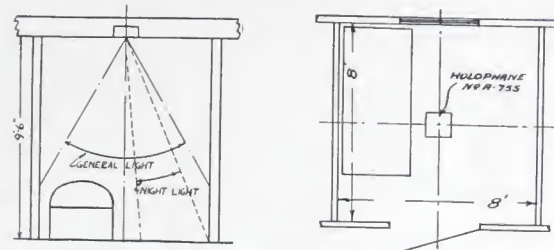
The latter location will be best for hospitals in the coastal regions as the resulting illumination can then be most easily reduced to that required under blackout conditions. The bed will hide the unit thus preventing any direct light upwards towards windows; and the brightness of the floor area will often be low enough, owing to the absorptive effect of floor finishes, to meet blackout needs. When the brightness is too high, owing to light floor finishes, a sheet of red gelatine can be inserted in the night light between the lens and the frame to cut the light down sufficiently.

### PSYCHIATRIC AREAS

The lighting of sick rooms, etc., used by psychiatric or "disturbed" patients is a specialized technique, requiring separate treatment in this Booklet.



*View of room using Holophane Psychiatric Light*



*At left, plan of room showing location of light. At right,  
sectional elevation of room showing General lighting  
and Night Light*

Judging from experience of past wars it is anticipated that our psychiatric population will become two-thirds greater than that of all other hospital cases combined.

Proper lighting is therefore of major importance. In the past, psychiatric pavilions were little better than jails. The casual visitor would have been struck by the bars, locks, keepers and all the other appurtenances of a well-kept jail. Today such indications of the scrupulous care with which "disturbed" patients must be guarded are carefully avoided and modern psychiatric pavilions appear both outwardly and inwardly, little different from the rest of the hospital. Obviously, the need for keeping the patients under strict control and at the same time preventing them from harming themselves, dictates the mechanical features of the lighting system.

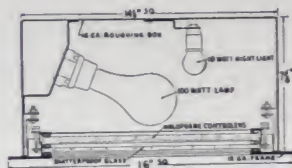
It is essential that the lighting units, the same as all the rest of the fixed equipment, be installed flush in the walls or ceilings with no projections that a patient can get a leverage under, or harm himself by contact. The lighting equipment must be as nearly foolproof as possible. It must be so designed and located that the patients cannot tamper with it. Because the light-transmitting elements of lighting fixtures must be made of glass and glass is breakable, there is an inherent hazard that must be guarded against. If a patient could secure a sliver of glass, he could do great



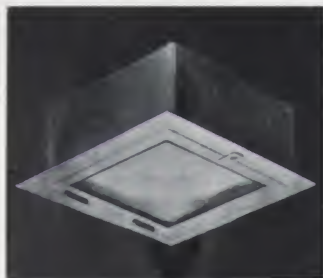
## LIGHTING for PSYCHIATRIC AREAS



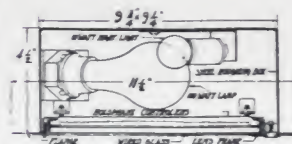
No. A-765



Line Sketch No. A-765



No. HF-739



Line Sketch No. HF-739



Corridor Lighting

### HOLOPHANE PSYCHIATRIC LIGHTING UNITS

#### PSYCHIATRIC AREAS (Cont.)

damage to himself or to others, with it. There are cases on record of this happening.

Further, the lighting units should be designed and located to reduce irritation to the patients. Patients are known to have ripped steel beds apart and used the pieces to hammer lighting fixtures that annoyed them. Wall fixtures, protected by heavy cast iron louvres (night lights) have been installed in some hospitals to be strong enough to accept rough treatment from the patients. This has been unsuccessful as it has resulted in the patients injuring themselves in their assaults on the heavy cast iron louvres. In one instance, a patient banged away at such a wall night light with his bare heel,

and before he was discovered he had received permanent injury.

The Holophane Company has developed two specific pieces of equipment with all this in mind (above, left).

Both units are for flush installation in the ceiling—the hardest place for the patient to reach. They are mechanically strong. The lens is further protected by a wired glass, or shatterproof glass cover depending upon conditions. The units can only be opened by a special tool. They are dirt-tight, they need only be opened for lamp replacements. Lastly these units have an auxiliary lamp that can always be adjusted to throw the night light beam away from the bed so as to prevent disturbing the patient.

### ENGINEERING SERVICE

The Holophane Company has maintained an Engineering Department for nearly half a century as a service to architects and engineers. It can help you to give your client the best lighting for the least cost. Its counsel is offered free and without obligation. Your blueprints will be welcome at all times.

Since our products are basically non-critical glass we can effect early deliveries even under war conditions—with a minimum use of critical materials.

One note of caution! The vicissitudes of war may cause changes in the specifications given in this booklet, or in the availability of some of the items.



## REFERENCE LIST

### ALASKA

Providence Hospital .....Anchorage

### ALABAMA

Infantile Paralysis Hosp.....Tuskegee

### CALIFORNIA

Kern General Hospital.....Bakersfield

Colusa Hospital .....Colusa

General Hospital .....Fresno

Kings County Hospital.....Hanford

Kaspere Cohn Hospital.....Los Angeles

Los Angeles County Hosp.....Los Angeles

Sante Fe Hospital.....Los Angeles

U. S. Navy Yard.....Mare Island

Butte County Hospital.....Oroville

Shasta County Hospital.....Redding

County of Riverside.....Riverside

Monterey Co. Tub. Hosp.....Salinas

Murphy Hospital .....Salinas

French Hospital .....San Francisco

Mills Hospital .....San Francisco

San Francisco Hospital.....San Francisco

San Francisco Psy. Hosp.....San Francisco

Spec. Gen. Hosp., So. Pacific Co.....San Francisco

Stockton State Hospital.....Stockton

### CONNECTICUT

Bridgeport Hospital .....Bridgeport

Middletown State Hosp. ....Middletown

Cedar Crest San. ....Newington

Fairfield State Hosp. ....Newtown

Norwich State Hosp. Inf. Bldg.....Norwich

Laurel Heights San. ....Shelton

Hospital for Feeble Minded.....Southburg

### DELAWARE

Delaware Hospital .....Wilmington

### DISTRICT of COLUMBIA

Freedman's Hospital .....Washington

Garfield Hospital .....Washington

Mt. Alto Veterans' Hosp. ....Washington

Sibly Memorial Hosp. ....Washington

### FLORIDA

Florida State Hosp. ....Chattahoochee

Hope Haven Crippled Children's Hosp.....Jacksonville

### GEORGIA

Taylor Memorial Hosp. ....Hawkinville

State Hospital .....Milledgeville

### ILLINOIS

Billings Memorial Hosp. ....Chicago

Chicago Lying-In Hosp. ....Chicago

Chicago Psy. Hospital .....Chicago

Children's Mem. Hosp. ....Chicago

St. Elizabeth's Hosp. ....Chicago

State Hospital .....Dixon

Elgin Hospital .....Elgin

State Diagnostic Hosp. ....Joliet

Mantino Hospital .....Mantino

### INDIANA

Little Sisters for the Poor,  
St. Francis Hospital .....Batesville

Drum Memorial Hospital .....Bedford

City Hospital .....Indianapolis

Riley Memorial Hosp. ....Indianapolis

Porter Memorial Hosp. ....Valparaiso

### IOWA

Mercy Hospital .....Davenport

### KANSAS

General Hospital .....Lawrence

Kansas Memorial Hosp. ....Lawrence

### KENTUCKY

Booth Memorial Hosp. ....Covington

Children's Home .....Covington

Kentucky State Hospital .....Danville

### LOUISIANA

New Orleans Charity Hosp. ....New Orleans

### MAINE

Augusta State Hospital .....Augusta

Maine General Hospital .....Lewiston

Pownal State School Hosp. ....Pownal

Damariscotta Hospital .....Rockland

Maternity Hospital .....Skowhegan

### MARYLAND

Baltimore City Hosp. ....Baltimore

John Hopkins Hospital .....Baltimore

Univ. of Maryland Hosp. ....Baltimore

Crownsville State Hosp. ....Crownsville



# REFERENCE LIST

## MASSACHUSETTS

City of Boston .....	Boston
Boston City Hospital .....	Boston
Boston City Hosp., Path. Bldg. ....	Boston
Boston Dispensary .....	Boston
City Hosp., Out-Patients Bldg. ....	Boston
General Hosp., Eye & Ear Inf. ....	Boston
Mass. Gen. Hosp. ....	Boston
Pratt Diagnostic Hosp. ....	Boston
Long Island Hospital .....	Boston Harbor
Free Hosp. for Women .....	Brookline
Danvers State Hospital .....	Danvers
Burbank Hospital .....	Fitchburg
Benson Hospital .....	Haverhill
Lowell General Hospital .....	Lowell
Medfield State Hospital .....	Medfield
Newton Hospital .....	Newton
Cooley Dickinson Hospital .....	Northampton
Norfolk Prison State Hosp. ....	Norfolk
Taunton State Hospital .....	Taunton
Tewksbury Infirmary .....	Tewksbury
Westfield State San. ....	Westfield
Worcester City Hospital .....	Worcester

## MICHIGAN

Hudson Motor Emergency Hosp. ....	Detroit
New Harper Hosp. Add. ....	Detroit
Wayne County Prov. Board.....	Eliose
Fisher Body .....	Grand Rapids
W. A. Foote Hospital .....	Jackson
Pontiac State Hospital .....	Pontiac
Pinecrest Sanatorium .....	Powers
Wahjamega State Hosp. ....	Wahjamega

## MINNESOTA

Hospital for Feeble Minded .....	Faribault
Minn. Dental Bldg. ....	Minneapolis
Indian Hospital .....	St. Paul
St. Barnabas Hospital .....	St. Paul
University Hospital .....	St. Paul
Minnesota State Prison .....	Stillwater

## MISSOURI

Firman Des Loge Hosp. ....	St. Louis
Fulton Hospital .....	St. Louis

## MONTANA

St. James Hospital .....	Butte
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## NEW HAMPSHIRE

Memorial Hospital .....	North Conway
Portsmouth Gen. Hosp. ....	Portsmouth

## NEW MEXICO

Tucumcari General Hospital.....	Tucumcari
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## NEW JERSEY

Soho Hospital .....	Belleville
Essex County Hospital .....	Cedar Grove
Dover General Hospital .....	Dover
Newark Industrial Clinic .....	Newark
St. Barnabas Hospital .....	Newark
St. Joseph's Hospital.....	Paterson

## NEW YORK

Binghamton City Hosp. ....	Binghamton
Adelphi Sanitarium .....	Brooklyn
Kings County Hospital .....	Brooklyn
Midwood Sanitarium .....	Brooklyn
Buffalo General Hospital .....	Buffalo
City Hospital .....	Buffalo
Children's Hospital .....	Buffalo
Columbus Hospital .....	Buffalo
Catskill Memorial Hosp. ....	Catskill
Dannemora State Hosp. ....	Dannemora
Creedmoor Hospital .....	Jamaica
Ulster County Hospital .....	Kingston
Southampton Hospital .....	L. I. City
New Rochelle Hospital .....	New Rochelle
Cancer Memorial Hospital .....	N. Y. City
Columbia Presby. Medical Center—	
Eye Hospital .....	N. Y. City
Eye Institute .....	N. Y. City
Hudson River State Hospital .....	N. Y. City
Lebanon Hospital .....	N. Y. City
Mt. Sinai Hospital .....	N. Y. City
N. Y. & Cornell Med. School .....	N. Y. City
New York Hosp., Bldg. B .....	N. Y. City
St. Luke's Hospital .....	N. Y. City
Wards Island Hospital .....	N. Y. City
St. Francis Hospital .....	Olean
Monroe County Hospital .....	Rochester
Rockland Co. State Hosp. ....	Rockland
General Electric Co. ....	Schenectady
Troy Hospital .....	Troy
Oneida County Hospital .....	Utica
White Plains Hospital .....	White Plains

## NORTH CAROLINA

Duke University Hospital .....	Durham
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## REFERENCE LIST

### OHIO

Akron City Hospital .....Akron  
 Children's Hospital .....Akron  
 Peoples Hospital .....Akron  
 St. Thomas Hospital .....Akron  
 Bethesda Hospital .....Cincinnati  
 Children's Hosp. Clinic .....Cincinnati  
 Cincinnati General Hosp. ....Cincinnati  
 Christ Hospital .....Cincinnati  
 City Hospital .....Cincinnati  
 Crippled Children's Home .....Cincinnati  
 Deaconess Hospital .....Cincinnati  
 Good Samaritan Hospital .....Cincinnati  
 Hamilton Co. T.B. Hosp. ....Cincinnati  
 Christian R. Homes Hosp. ....Cincinnati  
 Jewish Hosp. Nurses' Home .....Cincinnati  
 Tuberculosis Hospital .....Cincinnati  
 Cleveland City Hospital .....Cleveland  
 Cleveland Clinic .....Cleveland  
 Dr. Crile's Hospital .....Cleveland  
 Dr. Hanson's Clinic .....Cleveland  
 Lakeside Hospital .....Cleveland  
 Mercy Hospital .....Hamilton  
 Lancaster Hospital .....Lancaster  
 Licking Co. T.B. Hosp. ....Newark  
 Newark Hospital .....Newark  
 Painesville City Hosp. ....Painesville  
 New City Hospital .....Springfield  
 Youngstown Hospital .....Youngstown

### OKLAHOMA

Vinita Hospital .....Vinita

### PENNSYLVANIA

Abington Memorial Hospital .....Abington  
 Altoona Hospital .....Altoona  
 Allentown Hospital .....Allentown  
 Allentown State Hosp. ....Allentown  
 New Bloomsburg Hospital .....Bloomsburg  
 Pennsylvania State Sanatorium.....Cresson  
 Danville Hospital .....Danville  
 Harrisburg State Hosp. ....Harrisburg  
 Meadville Hospital .....Meadville  
 Drueding Hospital .....Philadelphia  
 Presbyterian Hospital .....Philadelphia  
 New Allegheny Gen. Hosp. ....Pittsburgh  
 Fairview Hospital .....Reading  
 Robert Packer Hospital .....Sayre  
 Sewickley Hospital .....Sewickley  
 Fairview Hospital .....Waymart

### RHODE ISLAND

Medical & Surgical Bldg. ....Howard  
 Memorial Hospital .....Pawtucket

### SOUTH CAROLINA

St. Mary's Hospital .....Greenville  
 Tri-County Hospital .....Orangeburg  
 Spartanburg Gen. Hosp. ....Spartanburg

### TENNESSEE

St. Mary's Hospital .....Knoxville  
 St. Mercy Hospital .....Knoxville  
 Tenn. Armature & Motor Works.....Knoxville  
 Vanderbilt Hospital .....Nashville

### UTAH

Price Hospital .....Price

### WASHINGTON

Stevens County Hospital .....Colville  
 County Hospital .....Northern  
 St. Elizabeth Hospital .....Yakima

### WEST VIRGINIA

Morris Memorial Hospital .....Logan  
 St. Joseph's Hospital .....Parkersburg

### WISCONSIN

Lutheran Deaconess Hosp. ....Beaver Dam  
 Sacred Heart Hospital .....Beaver Dam  
 St. Francis Hospital.....La Crosse  
 Emergency Hospital .....Milwaukee  
 Johnston Hospital .....Milwaukee  
 Mathews Keehnan Health Center.....Milwaukee  
 Milwaukee County Hospital .....Milwaukee  
 St. Nicholas Hospital.....Shebbogan  
 Wycena Hospital .....Wycena

### U. S. ARMY HOSPITALS

Phoenix, Arizona	Bermuda Base
Richmond, Cal.	Fort Clayton, Canal Zone
Camp Carson, Col.	Argentia, Newfoundland
Fort Gullick, Pan.	Borrenquen, P. R.
Santa Lucia, B.W.I.	Brigham City, Utah
	Seattle, Washington

### U. S. NAVY HOSPITALS

Mare Island, Cal.	San Diego, Cal.
Pearl Harbor, Haw.	Baltimore, Maryland
Bethesda, Maryland	Great Lakes, Mich.
Elizabeth City, N. C.	Portsmouth, N. H.
Norfolk, Va.	Quantico, Va.
	Puget Sound, Wash.



## QUOTATIONS *from* HOSPITAL AUTHORITIES

### GENERAL SATISFACTION . . .

"Answering your letter of December 3rd regarding the merits of your lighting system in our major operating rooms, we are pleased to advise that this system has proven satisfactory. We have asked opinions and criticisms of the doctors and they are pleased and satisfied with the lighting system. We are pleased to recommend the Holophane operating room lighting system."\*

"In answer to your letter of the 3rd, would say the Doctors have never entered any complaint concerning the Holophane light. We have always found it very satisfactory, as well as efficient and economical."\*\*

"We have been entirely satisfied with our Holophane operating room lights and have had no complaint from the members of our staff. We have a number of surgeons on our staff who wear glasses but none of them have complained that the light caused them any difficulty. We have made no attempt to vary the intensity or direction of the light ray by use of the control switch. The lights have been in use here now approximately two years and we have done several thousand operations. I feel that if we were going to have any difficulty it would have manifested itself by this time."\*\*\*

"We were very glad to write Dr. S. S. Goldwater with reference to the Holophane Operating Room Light as everyone connected with this institution feels that it is the finest light on the market. We have had a number of Doctors from different hospitals in the City operating under this light and they all were loud in their praises of the system."\*\*\*\*

### HEAT . . .

"We do not note any appreciable increase in the temperature of the room and altogether are very pleased with the three types of installation—the Major, Minor and Obstetrical, each installed to give maximum efficiency for the particular kind of work in each."†

### NEED FOR AUXILIARY LIGHTS . . .

"It so happens that at no time have I had occasion to use the spot light, which is always kept in the operating room. The appearance of the room is improved, by the absence of hanging fixtures. The operating room nurses are rather enthusiastic about the system, because there are no hanging fixtures from which the dust must be cleaned."††

### SHADOWS AND REFLECTIONS . . .

"There are many things that I could say about this system. As to its lighting, it is as near faultless as a lighting system could possibly be. There is practically an absence of shadows and the field is well illuminated."††

"The no shadow feature is pronounced in effect and at the same time we have the general illumination so necessary for anesthetist and other workers away from the central field of operation."†

"One of our busiest surgeons wears eye glasses when he operates and has no trouble with reflections. He reports sufficient light without using all the lights, in fact he very seldom turns on all the lights in the operating room while working."†††

\*St. Thomas Hospital, Akron, Ohio.

\*\*Bloomsburg Hospital, Bloomsburg, Pa.

\*\*\*The Children's Hospital.

\*\*\*\*The Midwood Sanatorium, Brooklyn, N. Y.

†Cedars of Lebanon Hospital, Los Angeles, Cal.

††Drs. Dawson & Davee, River Falls, Wisc.

†††The Youngstown Hospital Asso., Youngstown, Ohio.



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• HOLOPHANE CO., INC., 342 MADISON AVENUE, NEW YORK

• HOLOPHANE CO., LTD., 385 YONGE STREET, TORONTO, CANADA